

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended) A data multiplexing apparatus for multiplexing a plurality of packet streams and outputting a multiplexed packet stream, the data multiplexing apparatus comprising:

a data multiplexing unit operable to generate a first stream by multiplexing at least one first packet stream and a plurality of null packets by combining the at least one first packet stream with an appropriate number of the null packets so that the first stream is outputted at a predetermined transmission rate;

a packet stream storage unit including locations for storing a second packet stream, the second packet stream including predetermined blocks of packets, each predetermined block including a starting packet; and

a packet replacement unit operable to generate the multiplexed packet stream by replacing at least some of the null packets of the first stream with packets of the second packet stream,

wherein the data multiplexing unit includes:

a channel buffer operable to multiplex the at least one first packet stream and the null packets and store the multiplexed packet stream as the first stream;

a multiplexing order generation unit operable to generate order information indicating an order of packets to be multiplexed to form the first stream, for every cycle of a predetermined period of time;

a multiplexing order storage unit operable to store the order information;

a flag generation unit operable to generate a flag indicating a state of how the order information is stored in the multiplexing order storage unit; and

a multiplexing total number control unit operable to determine a total number of packets to be multiplexed for every cycle of the predetermined period of time, based on the flag generated by the flag generation unit and operable to control the multiplexing order generation unit based on the determined total number of packets,

wherein the multiplexing order generation unit is operable to generate the order information so that a sum of a number of the null packets and a number of the packets of the first packet stream multiplexed for every cycle of the predetermined period of time is equal to the

determined total number of packets,
wherein the data multiplexing unit is operable to output the first stream at the
predetermined transmission rate through multiplexing, by the channel buffer, of the at least one
first packet stream and the null packets based on the order information generated by the
multiplexing order generating unit, and

wherein the packet replacement unit includes comprises:

an address obtaining subunit operable to obtain an address, in the packet stream storage unit, for each location at which the starting packets of the predetermined blocks of packets are stored;

a null packet detection subunit operable to detect the null packets within the first stream;

a packet number obtaining subunit operable to obtain a number of packets for each predetermined block of packets of the second packet stream; and

a packet replacement subunit operable to generate the multiplexed packet stream by replacing at least some of the null packets detected by the null packet detection subunit with the packets of at least one of the predetermined blocks of the second packet stream, in sequence, and starting from the starting packet at the address obtained by the address obtaining subunit, a number of packets replacing the null packets being equivalent to the number of packets of the predetermined block obtained by the packet number obtaining subunit.

Claim 2 (Cancelled)

Claim 3 (Cancelled)

Claim 4 (Previously Presented) The data multiplexing apparatus according to Claim 1, wherein the number of packets for each predetermined block obtained by the packet number obtaining subunit is equal to or less than a total number of packets included in each predetermined block of the second packet stream stored in the packet stream storage unit.

Claim 5 (Previously Presented) The data multiplexing apparatus according to Claim 1, wherein the packet replacement subunit starts replacing the null packets when the address

obtaining subunit obtains an address of a starting packet of one of the predetermined blocks.

Claim 6 (Cancelled)

Claim 7 (Currently Amended) The data multiplexing apparatus according to Claim 1-Claim 6, wherein the flag generated by the flag generation unit includes a first flag and a second flag, the first flag indicating that a number of stored packets is equal to or less than a first predetermined value, the second flag indicating that the number of stored packets is equal to or more than a second predetermined value.

Claim 8 (Previously Presented) The data multiplexing apparatus according to Claim 1, wherein the second packet stream comprises data having no time-base information.

Claim 9 (Previously Presented) The data multiplexing apparatus according to Claim 8, wherein the second packet stream is a packet stream of private data.

Claim 10 (Previously Presented) The data multiplexing apparatus according to Claim 1, wherein the first packet stream is a packet stream including at least one of a video signal and an audio signal.

Claim 11 (Previously Presented) The data multiplexing apparatus according to claim 1, wherein the packet stream storage unit is a synchronous dynamic RAM.

Claim 12 (Currently Amended) A transmission apparatus for multiplexing a plurality of packet streams and transmitting a multiplexed packet stream, the transmission apparatus comprising:

a data multiplexing unit operable to generate a first stream by multiplexing at least one first packet stream and a plurality of null packets by combining the at least one first packet stream with an appropriate number of the null packets so that the first stream is outputted at a predetermined transmission rate;;

a packet stream storage unit including locations for storing a second packet stream, the

second packet stream including predetermined blocks of packets, each predetermined block including a starting packet;

a packet replacement unit operable to generate the multiplexed packet stream by replacing at least some of the null packets of the first stream with packets of the second packet stream; and

a transmission unit operable to transmit the multiplexed packet stream generated by the packet replacement unit,

wherein the data multiplexing unit includes:

a channel buffer operable to multiplex the at least one first packet stream and the null packets and store the multiplexed packet stream as the first stream;

a multiplexing order generation unit operable to generate order information indicating an order of packets to be multiplexed to form the first stream, for every cycle of a predetermined period of time;

a multiplexing order storage unit operable to store the order information;

a flag generation unit operable to generate a flag indicating a state of how the order information is stored in the multiplexing order storage unit; and

a multiplexing total number control unit operable to determine a total number of packets to be multiplexed for every cycle of the predetermined period of time, based on the flag generated by the flag generation unit and operable to control the multiplexing order generation unit based on the determined total number of packets,

wherein the multiplexing order generation unit is operable to generate the order information so that a sum of a number of the null packets and a number of the packets of the first packet stream multiplexed for every cycle of the predetermined period of time is equal to the determined total number of packets,

wherein the data multiplexing unit is operable to output the first stream at the predetermined transmission rate through multiplexing, by the channel buffer, of the at least one first packet stream and the null packets based on the order information generated by the multiplexing order generation unit, and

wherein the packet replacement unit includes comprises:

an address obtaining subunit operable to obtain an address, in the packet stream

storage unit, for each location at which the starting packets of the predetermined blocks of packets are stored;

a null packet detection subunit operable to detect the null packets within the first stream;

a packet number obtaining subunit operable to obtain a number of packets for each predetermined block of packets of the second packet stream; and

a packet replacement subunit operable to generate the multiplexed packet stream by replacing at least some of the null packets detected by the null packet detection subunit with the packets of at least one of the predetermined blocks of the second packet stream, in sequence, and starting from the starting packet at the address obtained by the address obtaining subunit, a number of packets replacing the null packets being equivalent to the number of packets of the predetermined block obtained by the packet number obtaining subunit.

Claim 13 (Currently Amended) A data multiplexing method for using a data multiplexing apparatus for multiplexing a plurality of packet streams and outputting a multiplexed packet stream, the data multiplexing apparatus including a packet stream storage unit including locations for storing a second packet stream, the second packet stream including predetermined blocks of packets, each predetermined block including a starting packet, the data multiplexing method comprising:

generating a first stream by multiplexing at least one first packet stream and a plurality of null packets by combining the at least one first packet stream with an appropriate number of the null packets so that the first stream is outputted at a predetermined transmission rate; and

generating the multiplexed packet stream by replacing at least some of the null packets of the first stream with packets of the second packet stream,

wherein said generating of the first stream includes:

multiplexing the at least one first packet stream and the null packets and storing the multiplexed packet stream as the first stream;

generating order information indicating an order of packets to be multiplexed to form the first stream, for every cycle of a predetermined period of time;

storing the order information;

generating a flag indicating a state of how the order information is stored; and

determining a total number of packets to be multiplexed for every cycle of the predetermined period of time, based on the flag generated by said generating of the flag, and controlling said generating of the order information based on the determined total number of packets,

wherein said generating of the order information includes generating the order information so that a sum of a number of the null packets and a number of the packets of the first packet stream multiplexed for every cycle of the predetermined period of time is equal to the determined total number of packets,

wherein said generating of the first stream includes outputting the first stream at the predetermined transmission rate through multiplexing, by said multiplexing, of the at least one first packet stream and the null packets based on the order information, and

wherein said generating of the multiplexed packet stream further includes comprises:

obtaining an address, in the packet stream storage unit, for each location at which the starting packets of the predetermined blocks of packets are stored;

detecting the null packets within the first stream;

obtaining a number of packets for each predetermined block of packets of the second packet stream; and

generating the multiplexed packet stream by replacing at least some of the null packets, detected by said detecting of the null packets, with the packets of at least one of the predetermined blocks of the second packet stream, in sequence, and starting from the starting packet at the address obtained by said obtaining of the address, a number of packets replacing the null packets being equivalent to the number of packets of the predetermined block obtained by said obtaining of the number of packets.

Claim 14 (Currently Amended) A computer program recorded on a computer-readable recording medium, the computer program for using a data multiplexing apparatus for multiplexing a plurality of packet streams and outputting a multiplexed packet stream, the data multiplexing apparatus including a packet stream storage unit including locations for storing a second packet stream, the second packet stream including predetermined blocks of packets, each predetermined block including a starting packet, the computer program causing the data multiplexing apparatus to execute a method comprising:

generating a first stream by multiplexing at least one first packet stream and a plurality of null packets by combining the at least one first packet stream with an appropriate number of the null packets so that the first stream is outputted at a predetermined transmission rate; and

generating the multiplexed packet stream by replacing at least some of the null packets of the first stream with packets of the second packet stream,

wherein said generating of the first stream includes:

multiplexing the at least one first packet stream and the null packets and storing the multiplexed packet stream as the first stream;

generating order information indicating an order of packets to be multiplexed to form the first stream, for every cycle of a predetermined period of time;

storing the order information;

generating a flag indicating a state of how the order information is stored; and determining a total number of packets to be multiplexed for every cycle of the predetermined period of time, based on the flag generated by said generating of the flag, and controlling said generating of the order information based on the determined total number of packets.

wherein said generating of the order information includes generating the order information so that a sum of a number of the null packets and a number of the packets of the first packet stream multiplexed for every cycle of the predetermined period of time is equal to the determined total number of packets.

wherein said generating of the first stream includes outputting the first stream at the predetermined transmission rate through multiplexing, by said multiplexing, of the at least one first packet stream and the null packets based on the order information, and

wherein said generating of the multiplexed packet stream further includes comprises:

obtaining an address, in the packet stream storage unit, for each location at which the starting packets of the predetermined blocks of packets are stored;

detecting the null packets within the first stream;

obtaining a number of packets for each predetermined block of packets of the second packet stream; and

generating the multiplexed packet stream by replacing at least some of the null packets, detected by said detecting of the null packets, with the packets of at least one of the

predetermined blocks of the second packet stream, in sequence, and starting from the starting packet at the address obtained by said obtaining of the address, a number of packets replacing the null packets being equivalent to the number of packets of the predetermined block obtained by said obtaining of the number of packets.

Claim 15 (Cancelled)